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10/622,848

07/18/2003

Norman L. Oberski

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25281

7590

04/19/2005

DICKE, BILLIG & CZAJA, P.L.L.C.

FIFTH STREET TOWERS

100 SOUTH FIFTH STREET, SUITE 2250

MINNEAPOLIS, MN 55402

EXAMINER

MONBLEAU, DAVIENNE N

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/622,848

Applicant(s)

OBERSKI ET AL.

Examiner

Davienne Monbleau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

The abstract of the disclosure is objected to because it does not accurately portray the features of the claimed invention. Correction is required. See MPEP § 608.01(b).

### *Claim Rejections - 35 USC § 112*

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 1, there is insufficient structure to support the claimed invention. Reciting only an auxiliary sensor does not further limit an inspection system.

Claims 2-10 are rejected as being dependent on an indefinite base claim.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

*Claims 1-5, 8-14, and 18-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimoda et al. (U.S. 2003/0053676).*

Regarding Claim 1, *Shimoda* discloses in Figure 2 an inspection system comprising an auxiliary sensor (205) for mapping a sample height by obtaining height data for at least one point on the sample.

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Regarding Claim 2, *Shimoda* discloses in Figure 2 that the height data is used to position an inspection device in focus during an inspection of the sample. (See also paragraphs [0075] to [0079].

Regarding Claim 3, *Shimoda* discloses in Figure 30c and in paragraph [0142] that the height data is used in an interpolation to calculate an exact height of each picture needed for the inspection of the sample.

Regarding Claim 4, *Shimoda* discloses in claim 14 that mapping the sample height is performed as a separate operation before the inspection of the sample occurs.

Regarding Claim 5, *Shimoda* discloses in claim 1 that the process of mapping the sample height is performed concurrent with the inspection of the sample.

Regarding Claim 8, *Shimoda* discloses in Figure 5 that the height data comprises a pattern comprising a fixed 2D grid of points.

Regarding Claim 9, *Shimoda* discloses in Figure 2 a calibrator (39) for finding the offset between the auxiliary sensor and an inspection lens (17).

Regarding Claim 10, *Shimoda* discloses in Figure 2 that the auxiliary sensor (205) comprises a 3D point sensor.

Regarding Claim 11, *Shimoda* discloses in Figure 2 and claim 14 an inspection system comprising a camera (21) for inspecting a wafer and a 3D point sensor (205) for determining the heights of a plurality of points on the wafer surface before the wafer (18) is inspected by the camera (21), wherein the heights of the plurality of points on the wafer surface are used for setting the focus of the camera (21).

Regarding Claim 12, *Shimoda* discloses in Figure 2 an inspection platform (23) for holding the wafer (18) while the wafer (18) is inspected.

Regarding Claim 13, *Shimoda* discloses in Figure 2 a wafer alignment device (27) coupled to the inspection platform (23) for moving the inspection platform (23) relative to the camera (21).

Regarding Claim 14, *Shimoda* discloses in Figure 2 an objective (17) for use with the camera (21) for inspecting the wafer (18).

Regarding Claim 18, *Shimoda* discloses in Figure 2 a method for inspecting a wafer (18) comprising providing an inspection sensor (21), providing an auxiliary sensor (205), obtaining height data of a surface of the wafer (18) using the auxiliary sensor (205), and inspecting the surface of the wafer (18) by focusing the inspection sensor (21) using the height data. (See also paragraphs [0072] to [0079].)

Regarding Claim 19, *Shimoda* discloses in Figure 2 that inspection sensor (21) comprises a camera.

Regarding Claim 20, *Shimoda* discloses in Figure 2 that inspecting the surface of the wafer (18) by focusing the inspection sensor (21) using the height data comprises interpolating the height data to determine heights at which to take pictures of the wafer (18). (See also Figure 30c and in paragraph [0142].)

Regarding Claim 21, *Shimoda* discloses in Figure 2 that the auxiliary sensor (205) comprises a 3D point sensor.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

*Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda.*

Regarding Claim 15, *Shimoda* teaches in Figure 2 that said 3D point sensor (205) and objective (17) have a field of view and further teaches in claim 14 that the focusing is done prior to inspection, but does not teach the how the field of views relate to each other. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use particular field of views in *Shimoda* to eliminate the need for focusing during inspection of the wafer in order to increase operation and cost efficiency.

Regarding Claim 16, *Shimoda* teaches in Figure 2 an objective (17) but does not teach a plurality of selectable objectives. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use a plurality of selectable objectives in *Shimoda* to

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accommodate a wider range of field of views, thus enabling inspection of many different kinds of samples with different resolution needs.

Regarding Claim 17, *Shimoda* teaches in paragraph [0162] that confocal optics may be used but does not teach that said sensor is confocal. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use a confocal sensor in *Shimoda* to minimize the number of optical components required.

*Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda in view of Clark (U.S. 2004/0021877).*

Regarding Claim 6, *Shimoda* teaches in Figure 2 measuring the height of sample points on a wafer (18) but does not teach measuring the difference in height of features on the wafer (18). *Clark* teaches in paragraph [0026] measuring height difference of the features. It would have been obvious to one of ordinary skill in the art at the time of the invention to measure height differences of the features in *Shimoda*, as taught by *Clark*, to provide complete 3D information of all surface features.

Regarding Claim 7, *Clark* further teaches in paragraph [0026] that the feature may be a solder interconnect.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

*O'Dell et al. (U.S. 6,324,298)* teaches an automated defect inspection system.

*Tokita (U.S. 6,876,438)* teaches an exposure apparatus comprising a measuring unit which measures a height of a substrate and adjusts the position to align the substrate and optics.

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*Chuang et al. (U.S. 6,611,344)* teaches an apparatus to optical measure 3D data of an object.

*McCord et al. (U.S. 6,597,006)* teaches a dual beam symmetric apparatus for determining the height of a surface of a semiconductor wafer.

*Jasper et al. (U.S. 6,674,510)* teaches an off-axis leveling apparatus comprising creating a height map of a substrate at a measurement station to determine the optimum position of the substrate.

*Hiroi et al. (U.S. 2002/0100872)* teaches an inspection method comprising an imaging device and a height measurement device.

*Mizuo et al. (U.S. 2004/0080742)* teaches an inspection device comprising auto-focusing means based on measured height data.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Davienne Monbleau whose telephone number is 571-272-1945.

The examiner can normally be reached on Mon-Fri 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR



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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Danienne Monbleau*

DNM

  
DAVID PORTA  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800